8-1-1980

Volume 4, Number 8 (August 1980)

The Solar Ocean Energy Liaison

Solar
OCEAN ENERGY
Liaison

INCORPORATING
The OTEC Liaison

VOLUME 4 NUMBER 8
August 1980

DEPARTMENT OF ENERGY SEEKS PROPOSALS FOR 40-MEGAWATT OCEAN THERMAL POWER PLANT

The long-awaited Program Opportunity Notice (PON DE-PN01-80CS-80000) announced by DOE July 1st has been issued. DOE is seeking proposals for a 40-megawatt (electric) OTEC plant, which would be 800 times the size of Mini-OTEC.

The project will be performed in six phases: (I) conceptual design, (II) preliminary design, (III) detailed design, (IV) construction, deployment, and acceptance testing, (V) joint operational testing and evaluation, and (VI) transfer of ownership and contractor operation.

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LOCKHEED RECEIVES SERI CONTRACT TO TEST OCEAN WAVE ENERGY SYSTEM

(Editor's note: Readers will note differences between the story below and a detailed article on Lockheed's Dam-Atoll which appeared in our June 1979 issue regarding the improved design. The earlier article, however, contains more detail as to Dam-Atoll's potential applications.)

A test system to explore the feasibility of producing electricity from the energy stored in ocean waves will be developed by Lockheed Missiles and Space Company under a two-year, $593,000 contract awarded by the Department of Energy's Solar Energy Research Institute (SERI).

Called Dam-Atoll, the system will be a 1/50th-scale model (five feet in diameter) of a full-size system that Lockheed estimates would be capable of producing from one to two megawatts.

Dam-Atoll receives its name from its dam-like convex shape and its theory of operation, which uses wave action similar

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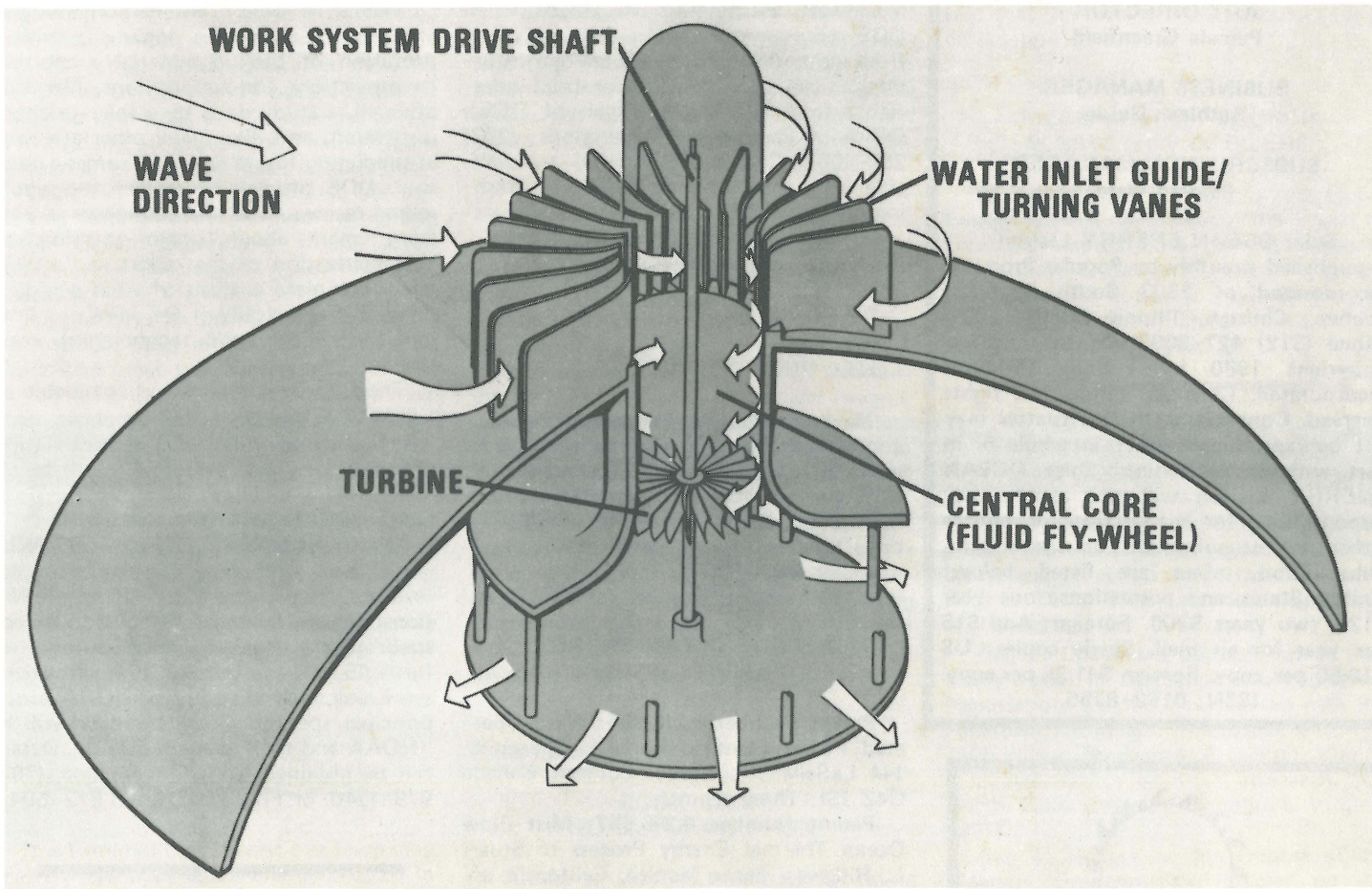

ELECTRICITY FROM THE SEA: This cutaway drawing of Lockheed Missiles and Space Company's full-scale (250-foot-diameter) Dam-Atoll device illustrates how ocean waves can be used to produce electricity. As the waves approach and surround the unit, they will be channeled by the inlet guide vanes into the central core, where a whirpool motion will be created. This swirling motion will turn the turbine generator to produce electricity, which can be carried by cable to shore. Lockheed will develop and test a 1/50th-scale model of the device under a two-year, $593,000 contract awarded by the Department of Energy's Solar Energy Research Institute.

Solar
OCEAN ENERGY
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AN INTERNATIONAL NEWSLETTER ENGAGED AS LIAISON FOR ALL FORMS OF SOLAR ENERGY FROM THE SEA, INCLUDING:
OTEC
(OCEAN THERMAL ENERGY CONVERSION)
WAVE - TIDAL - CURRENT
OFFSHORE WIND - BIOMASS
SALINITY GRADIENTS

VOLUME 4 NUMBER 8
August 1980

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Solar OCEAN ENERGY Liaison is published monthly by Popular Products Incorporated at 1303 South Michigan Avenue, Chicago, Illinois 60605, USA. Phone (312) 427-3000. Printed in USA.

Subscription prices are listed below: United States and possessions: one year $125, two years $200. Foreign: Add $15 per year for air mail. Single copies: US $10.50 per copy. Foreign $11.25 per copy.
ISSN: 0162-8755

SOLAR OCEAN ENERGY

DEPARTMENT OF ENERGY SEEKS PROPOSALS FOR 40-MEGAWATT OCEAN THERMAL POWER PLANT

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DOE sources expect from five to eight awards to result from the PON, with federal cost-sharing of $500,000 per award for the first phase. Total cost-sharing for contractors on all phases is expected to be between 15% and 40%. Phases II to VI will be exercised only at the option of DOE, with evaluation of Phases II to IV based on performances of Phase I.

In other words, despite the glorious rhetoric of both DOE personnel and the recently-passed legislation setting long-range goals for OTEC (see the June and July issues of OE), the present commitment is for conceptual design only.

Proposals for the PON are required by January 9th, 1981, and the projected date of awards is June 30th, 1981. Based on past slippage of DOE target dates, however, the realistic date of awards for this major OTEC project will more likely be late fall of 1981. (The OTEC-1 contract award was made almost six months after the original DOE target date.)

A Preproposal Conference is slated for 9 am October 8th at the Departmental Auditorium, 1301 Constitution Avenue Northwest, Washington DC 20230, when DOE representatives will answer questions from potential bidders. Telephone information can be obtained (for brief questions) from Stanley Kaufman of DOE's Office of Procurement Operations, (202) 252-1063. Copies of the PON are available from that office at Box 2500, Washington DC 20013.

OTEC PUBLIC OFFERING READIED

OE has learned that a prospectus is near completion regarding a public offering for an OTEC research and development project, with target funding of $1.5 million. More complete details will be available by mid-October.

RECENT OCEAN ENERGY PATENTS ISSUED

Patent Number 4,216,655: Wave-Operated Power Plant to Hendrik Ghesquire, 144 LaSalle Street, Baue Comeau, Canada G4Z 1S1. Three claims.

Patent Number 4,216,657: Mist Flow Ocean Thermal Energy Process to Stuart L. Ridgway, Santa Monica, California, assignor to R&D Associates, Marina del Rey, California. Eighteen claims.

Patent Number 4,222,238: Apparatus for Obtaining Energy from Wave Motion to Gary E. McCulloch, 1471 Etna Drive, Tulare, California 93274. Ten claims.

SERI STUDY SHOWS US ENERGY USE TO PLUMMET, SOLAR TO PROVIDE 20% TO 33% BY THE YEAR 2000

According to a recent study by the Solar Energy Research Institute (SERI) of Golden, Colorado, energy use in the United States could be reduced by as much as one-fourth to one-fifth by the year 2000, and still have about 20% to 33% of its energy needs supplied by renewable resources.

The SERI Solar/Conservation Study was requested by DOE's Deputy Energy Secretary John Sawhill, recently named to head the new Synthetic Fuels Corporation.

The reduction in energy usage will be due primarily to conservation efforts and increased efficiencies in energy production. Neither extraordinary boosts in prices of current energy sources nor dramatic technological breakthroughs are assumed in the SERI projections.

Of all of the solar technologies, wind energy appears to be the most favorable both economically and socially, with Ocean Thermal Energy Conversion receiving particularly high marks in the latter area. "True social costs", as defined in the study, include an allowance for the cost of environmental quality and national security.

The SERI Solar/Conservation Study is a thorough, exhaustive document, with a profusion of backup material supporting its projections and suppositions. But it is, after all, a study done by a solar-oriented institution, and, like many other attempts at predicting future trends, assumes a great deal. DOE officials have given the report mixed reviews, with the comments varying from remarks about "sins of omission" to characterization of the report as "a relatively complete analysis of what could be done technologically if we were not limited by political and technological constraints".

The 900-page report was completed at a cost of $700,000.

OCEAN ENERGY COUNCIL ANNOUNCES 6TH OPEN MEETING

The Ocean Energy Council and the National Ocean Industries Association are cosponsoring a wine-and-cheese tutorial set for 4:45 to 7 pm October 15th with Richard Frank, Administrator of NOAA, as the principal speaker. Frank's subject will be "NOAA and the Future of OTEC". Details can be obtained from Eric Midboe, (703) 979-1240, or Fred Naef, (202) 872-5947.

OE has just received word that Ed Snyder, who has been active in the OTEC program at TRW for several years, has been named to replace Bob Douglas as head of TRW's Ocean Systems Division.

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to that observed around small coral islands (atolls).

Looking at a Dam-Atoll unit from the side, it resembles an open umbrella with a short, straight handle. The unit operates almost totally submerged, with only the upper 10% above water.

As waves approach, they wrap around the Dam-Atoll unit and enter a central core from all points. The waves actually change direction at the trailing edge of the unit, and enter the rear of Dam-Atoll moving in the opposite direction to that in which they were originally traveling.

Vanes on the top of Dam-Atoll channel waves into the 60-foot-deep central core, creating a vortex or whirlpool in the core to turn turbine blades and produce electricity.

A continuous input of water in the core is maintained by the time lag provided by the waves' wrapping action. As the old waves enter at the rear to complete a wave cycle, new waves approach and enter in front to continue the process.

Tom Higgins, Lockheed program director, said a typical mile of ocean waves contains enough energy to reproduce approximately 64 megawatts. Given this energy potential, a string of 500 to 1,000 Dam-Atoll units placed in a high-activity wave area such as the Pacific Northwest could generate as much power as Hoover Dam.

"The total power delivered daily to the shores of the world's oceans is almost equal to the total energy content of the world's daily oil production," said Higgins. "Ocean energy renews itself; oil does not."

Lockheed intends to conduct the upcoming tests of the scale model at its San Diego Ocean Laboratory, where ocean waves can be simulated in a 320-foot-long test tank.

Higgins says an operational unit could be made of steel or reinforced concrete. Dome-like steel structures similar in size to full-scale Dam-Atoll units already have been produced and are being used in the Middle East to store oil underwater. Models of these structures also were tested in the Lockheed wave tank.

One of the phonenomena associated with Dam-Atoll is that a calm stretch of water approximately equal to the diameter of the Dam-Atoll is produced on the leeward side of the unit. By stringing a group of Dam-Atoll units together, a deep-water harbor could be formed to offload petroleum and natural gas away from populated areas.

It is rumored that at least one team may propose hydrogen as the energy product in its bid for the 40MW pilot plant.

NEW "UMBRELLA" SOLAR GROUP BEING FORMED

A group of solar activists and businessmen are forming a new "umbrella" trade organization to be called the Renewable Energy Business Association. The REBA is being formed to link various pro-solar organizations, but is reportedly not intended to replace the financially-troubled Solar Energy Industries Association (SEIA).

The other major solar technology based on centralized solar-energy production, in addition to ocean systems/OTEC, is solar-thermal energy development. While OTEC is represented by the independent Ocean Energy Council, the solar-thermal industry is represented by the Solar Thermal Division of SEIA.

Thus far the Ocean Energy Council has had no communication with the newly-forming Renewable Energy Business Association. Apropos to the above, a newly-elected officer of the Solar Thermal Division of SEIA has confided to this editor that the Solar Thermal people are jealous of the great successes of the OTEC program, as specifically evidenced by the two major pieces of legislation signed into law this summer by President Carter.

While the various solar technologies will always be competing with one another for governmental favors, an "umbrella" solar and/or renewable-energy group representing the common needs of all of its potential members could be an effective spokesman to counter the interests and claims of conventional energy producers.

DOE'S BENNETT MILLER RESIGNS SAN MARTIN LIKELY REPLACEMENT

The repeated movement of top personnel within the US Department of Energy since its inception in October 1977 continues with the recently-announced resignation of Bennett Miller as Deputy Assistant Energy Secretary, citing personal reasons. Miller prefers to stay in the energy field, but has no definite plans.

Robert San Martin, currently Assistant Secretary for Field Operations and International Programs at DOE, is a likely replacement for Miller's position. A strong solar-energy advocate, San Martin was head of the New Mexico Solar Energy Institute before coming to DOE.

Tidal Power

COOK INLET TIDAL-POWER STUDY

Alaska is seeking proposals for using Cook Inlet Tides to generate electricity. The deadline is October 20th, 1980. Write to the Office of the Governor, Division of Policy Development and Planning, Pouch AD, Juneau, Alaska 99811, Attn: Frances Ulmer.

SAI RECEIVES COLD-WATER PIPE CONTRACT FROM NOAA

Science Applications Incorporated (SAI) of El Segundo, California has been chosen as the prime contractor to the National Oceanic and Atmospheric Administration (NOAA) to conduct laboratory tests necessary to develop the technology for building, deploying, and operating cold-water pipes for OTEC power plants.

Teamed with two local small businesses, Structural Composites Industries Incorporated of Azusa, California and Offshore Technology Corporation of Escondido, California, SAI will conduct analyses and laboratory tests to provide information on the design of prototype cold-water pipes 30 feet in diameter and 3,000 feet long. The value of the contract is $600,000.

Fiberglass-reinforced plastic composites are leading candidates for the construction of these large cold-water pipes for cost and technical reasons. However to ensure that the engineering concepts are sound, the team will be conducting material-property laboratory tests on the performance of fiberglass composites in seawater and model-basin laboratory tests on the dynamic response of scaled-model cold-water pipes subjected to ocean waves.

Duane Hove, Program Manager for SAI, said that the tests will take about a year to complete.

OCEAN ENERGY COUNCIL ELECTS NEW OFFICERS

At a September meeting of the Ocean Energy Council in Chicago, the Board of Directors elected Fred Naef as President and Richard Meyer as Secretary-Treasurer. Administrative duties will be centered in Chicago, with policy and other activities continuing in Washington DC.

US GOVERNMENT PROCUREMENT INVITATIONS AND CONTRACT AWARDS

Listed below are contract awards and procurement invitations related to solar ocean energy culled from the Commerce Business Daily. This is not to be construed as a complete list.

Aug 1: Continued Support for an Advisory Panel in Biological Oceanography: Negotiations are to be conducted with the American Institute of Biological Sciences, 1401 Wilson Boulevard, Arlington, Virginia 22209. Office of Naval Research, 800 North Quincy Street, Arlington, Virginia 22217.

Aug 4: Report on the Impact of the Japanese Government's Policies on the International Competitiveness of Its Automotive Sector: TSC will negotiate with SRI International, 333 Ravenswood Avenue, Menlo Park, California 94025. RFQ DTRS-57-80-Q-80201-SD. US Department of Transportation, Transportation

Systems Center, Kendall Square, Cambridge, Massachusetts 02142, Attn: 853-1.

Aug 4: Analysis of the Impact of Decentralized Technology on Electric Utilities: Comparison and Synthesis of Models: Contract DE-AC-02-80-CS-30438.A000, for $151,040, awarded to the University of Pennsylvania, Philadelphia, Pennsylvania 19104. US Department of Energy, 9800 South Cass Avenue, Argonne, Illinois 60439.

Aug 5: Investigation of the Surface Water pCO_2 in the Equatorial Pacific Ocean: Contract DE-AC-02-79-EV-10229.A001, for $58,923, awarded to Columbia University, New York, New York 10027. US Department of Energy, 9800 South Cass Avenue, Argonne, Illinois 60439.

Aug 7: National Solar Inquiry and Referral Service (NSIRS): Necessary labor resources to allow the Solar Energy Research Institute-based solar inquiry and referral service to fulfill its goal of responding to a high volume of inquiries (estimated at 2400 per month) in an appropriate and timely manner, thereby promoting increased public awareness, acceptance, and implementation of the solar option. The subcontractor will provide staff to respond to inquiries submitted to NSIRS in various modes, such as by telephone, by mail, and in person; provide training to inquiry staff; and assist in document acquisition and distribution. Firms which meet the minimum qualifications listed below will be mailed a request for proposal on or about September 1st, 1980. Minimum qualifications are: (1) Firm will perform work at SERI facility in Golden, Colorado. (2) Firm will have project director who will work on site for the duration of the contract, and who will have the following qualifications: (a) have been an employee of the firm for at least one year, and (b) have had ten years' relevant experience, including prior managerial and supervisory roles. (3) Firm will have basic knowledge of information systems, including familiarity with bibliographic and numeric data bases and organization of large and/or medium-size technical information centers. (4) Firm will have experience which includes managing contracts of $500,000 or more; staffing for long-term operations with information professionals and clerical support; supervising operations with personnel of 20 or more; and training professional and clerical personnel in complex work procedures. Firms meeting these qualifications and interested in being considered for evaluation should send a statement of their qualifications within two weeks of the date of this announcement to Solar Energy Research Institute, 1617 Cole Boulevard, Golden, Colorado 80401, Attn: W. P. Painter, Number 0-033.

Aug 7: Additional Services as Integrating Contracting in DOE's Residual Energy Applications Program, Including Waste Heat From Federal Facilities and High-Temperature Waste-Heat Utilization: Negotiations are being conducted with Arthur D. Little, Incorporated, Acorn Park, Cambridge, Massachusetts 02140. US Department of Energy, Oak Ridge Operations Office, PO Box E, Oak Ridge, Tennessee 37830.

Aug 7: Selenide Thermoelectric Materials Evaluation Program: Modification AO-12 to Contract DE-AC-02-76-ET-33002, for $600,867, awarded to Minnesota Mining and Manufacturing Company, St. Paul, Minnesota. US Department of Energy, 9800 South Cass Avenue, Argonne, Illinois 60439.

Aug 8: Analysis of Cable Deployment and Recovery: Contract N00014-78-C-0631, July 8th, 1980 (no RFP), $112,431, awarded to Portland State University, PO Box 751, Portland, Oregon 97207. Office of Naval Research, 800 North Quincy Street, Arlington, Virginia 22217.

Aug 8: Management and Technical Support Services for Energy Technology Overrun Due to Supply of Additional DPMH Within 10% DPMH Threshold: Contract AC-01-78-ET-60033 (formerly ET-78-C-0103168), unsolicited proposal, $214,861, awarded to TRW Incorporated Energy System Group, 8301 Greensboro Drive, McLean, Virginia 22102. US Department of Energy, Office of procurement Operations, Washington DC 20585.

Aug 12: Fabrication and Testing of a Thermoelectric Power Generator: MX-10057( )/G: The generator will be capable of delivering 500 watts of DC-rated power over an ambient temperature range from -31°C to +51°C and up to an elevation of 1500 meters. The unit will incorporate a multi-fuel regenerative burner system which will minimize infrared detection of the power source, and a sealed nickel-cadmium rechargeable battery to provide local or remote start. Solicitation DAAK-20-80-Q-0549 must be referenced in all requests. Expected date of release is August 1980, with opening 30 to 45 days thereafter. ETD/NV Contracts Branch, Fort Monmouth Contracts Office, US Army Electronics Research and Development Command, Attention DRDEL-AQ-M-3 (FES) Maria Festa, Fort Monmouth, New Jersey 07703.

Aug 12: Inventory of Federal Energy-Related Environment Health and Safety Research: It is suggested that small business firms or others interested in subcontracting opportunities in connection with the described procurement make direct contact with the DOE Document Control Specialist. Solicitation RFP-RP01-80-EV-10461.

Aug 18: Assessment of Long-Term Developments in Ocean Instrumentation: Negotiations are being conducted with Planning Systems Incorporated, 7900 Westpark Drive, McLean, Virginia 22101.

Aug 19: Long-Range Policy Studies of Renewable Resources and Technologies: Solicitation RFP RP01-81-PE-70270. Summary of long-range policy studies of renewable resources and technologies. The contractors will include studies of the fundamental long-term nature, causes, and potential solutions of the nation's energy problems, with particular focus on better understanding of the ways in which renewable resources and technologies penetrate existing markets, and the ways, costs, and benefits of encouraging such penetration. Anticipated three-year level-of-effort contract with options for two additional one-year periods. All requests must be in writing. Department of Energy, Office of Procurement Operations, Washington 20585.

Sep 8: Design, Build, Test, and Evaluate Internally and Externally Stirred Heat Exchangers to Assess Their Potential for Commercialization: Unsolicited proposal for $75,000. Contract (Grant) FG-01-80-CS-15016. Awardee/Contractor Frank W. Bailey, PO Box 94, Haskell, New Jersey 07420. US Department of Energy, Office of Procurement Operations, Washington DC 20585.